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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

COCKS, JOSIAH C

ART UNIT PAPER NUMBER

3749

DATE MAILED: 10/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/856,342

Applicant(s)

BRUGGENDICK ET AL.

Examiner

Josiah Cocks

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7-9, 11, 12 and 16-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7-9, 11, 12, and 16-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Receipt of applicant's amendment filed 8/12/2004 is acknowledged.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 7, 9, 11, 12, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by *Leikert et al.* (US # 4,790,743).

Leikert et al. discloses in Figures 1-3 a method of burning nitrogen containing fuel while reducing the emission of nitrogen oxides as described by applicant's claims 7, 11, 12, and 19 including producing a fuel-rich (i.e. sub-stoichiometric) primary flame core (zones 7 and 8) from fuel and primary air and adding a nitrogen oxide reducing agent (via nozzles 4) wherein the agent may consist of coal dust (i.e. a hydrocarbon fuel and thus a hydrocarbon as claimed) (see col. 2, lines 44-56). *Leikert et al.* further discloses that the flame core is enveloped with a veil of secondary air (see col. 3, lines 44-60) and the nitrogen reducing agent is introduced together with both primary/core air and with fuel (see col. 3, lines 14-35).

In regard to the limitation that the reducing agent is distributed within the flame core, the examiner considers this limitation met by *Leikert et al.* The examiner considers that flame zones

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(7 and 8) of *Leikert et al.* taken together are properly considered the flame core recited in applicant's claims. Leikert et al. describes the secondary zone (8) as being "in the vicinity and around the primary flame zone" (see col. 3, lines 34-35). As shown in Fig. 1, the reducing agent supplied via nozzles (4) is clearly distributed within the flame core formed from flame zones (7 and 8). The reduction fuel is described as being uniformly distributed over the cross-section of the combustion chamber (see col. 3, lines 55-60)

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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6. Claims 8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Leikert et al.* as applied to claims 7 and 9 above and further in view of *Beer et al.* (US # 5,411,394).

Leikert et al. discloses all the limitations of claims 8 and 9 except possibly a specific recitation of the flame temperature being greater than 1100 °C or a veil of tertiary air around the flame core.

In regard to claim 8, *Beer et al.* teaches a method of burning nitrogen containing fuel in the same field of endeavor as *Leikert et al.* wherein the method of *Beer et al.* acknowledges that low NO_x burners using gaseous fuel, coal or fuel oil and forming a fuel-rich flame core having a flame core temperature of 1700 K (approximately 1450 °C or greater). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made that the temperature of the flame core of *Leikert et al.* would be greater than 1100 °C or greater as taught by *Beer et al.* as such a temperature range is well known in the art as being desirable for low NO_x methods of burning (see *Beer et al.*, col. 3, lines 34-67)

In regard to claim 18, *Beer et al.* teaches a method of burning nitrogen containing fuel in the same field of endeavor as *Leikert et al.* wherein the method of *Beer et al.* includes a veil of tertiary air enveloping the flame core (see col. 8, lines 21-31 and Fig. 2b). Therefore in regard to claim 10, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the method of *Leikert et al.* to incorporate the tertiary air veil of *Beer et al.* as the use of a tertiary air veil is particularly preferred in further assisting in the reduction of NO_x production (see col. 8, lines 14-31).

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7. Alternatively, claims 7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Leikert et al.* (US # 4,790,743) in view of *Vier et al.* (US # 4,739,713).

Leikert et al. discloses in Figures 1-3 a method of burning nitrogen containing fuel while reducing the emission of nitrogen oxides substantially as described by applicant's claims 7 and 17 including producing a fuel-rich (i.e. sub-stoichiometric) primary flame core from fuel and primary air and adding a nitrogen oxide reducing agent wherein the agent may consist of coal dust (see col. 2, lines 44-56). *Leikert et al.* further discloses that the flame core is enveloped with a veil of secondary air (see col. 3, lines 44-60) and the nitrogen reducing agent is introduced together with both primary/core air and with fuel (see col. 3, lines 14-35).

In regard to the limitation that the reducing agent is nitrogen, the examiner notes that the title of the *Leikert et al.* patent is "Method of reducing the NO_x-emissions during combustion of *nitrogen-containing fuels*" (emphasis added). The fuel that is being utilized in *Leikert et al.* is coal dust thus implying that coal dust contains nitrogen and thus the coal dust supplied as a nitrogen oxide reducing agent would qualify as a nitrogen compound as claimed. In further support of this observation, the *Vier et al.* reference is cited. *Vier et al.* teaches a coal-dust fired combustion system in the same field of endeavor as *Leikert et al.*, wherein *Vier et al.* specifically discloses the coal dust is known in the art to include nitrogen which is termed "in-fuel" nitrogen (see *Vier et al.* col. 1, lines 41-45). A person of ordinary skill in the art would therefore recognize that the coal dust of *Leikert et al.*, which functions as a nitrogen oxide reducing agent, would include nitrogen and is, therefore, a nitrogen compound as claimed.

Further, in regard to the limitation that the nitrogen compound is natural gas or methane, *Leikert et al.* discloses that the reduction agent may be a "burnable gas" (see col. 2, lines 54-55).

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The examiner considers that a person of ordinary skill in the art would reasonably consider the selection of a well-known combustible gas such as natural gas or methane as the "burnable gas" to function as the reduction fuel.

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Leikert et al.* in view of *Vier et al.* as applied to claim 7 above, and further in view of *Svendssen* (US # 5,809,910).

Leikert et al. in view of *Vier et al.* teach all the limitations of claim 16 except that the nitrogen compound is either ammonia, ammonia water, or urea.

Svendssen teaches a method of burning a fuel and reducing NO_x production that is analogous to *Leikert et al.* In *Svendssen*, a reducing agent such as ammonia or urea is added to the fuel (see col. 3, lines 59-67).

Therefore, in regard to claim 16, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the reduction agent of *Svendssen* to be urea or ammonia as taught by *Svendssen* as these chemicals are recognized in the art as suitable to bring about a desired reduction in NO_x production when they added to a fuel for combustion (see *Svendssen*, col. 3, lines 59-67).

Response to Arguments

9. Applicant's arguments filed 8/12/2004 have been fully considered but they are not persuasive. Applicant has amended the claims to recite that the reducing agent is "distributed within the flame core" and argues that this limitation distinguishes over the *Leikert et al.*

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reference. However, as noted above, the examiner considers that flame zones (7 and 8) are properly considered the flame core recited in applicant's claims. The reducing agent is supplied via nozzles (4) to form a flame zone (8) that is in the vicinity and around flame zone (7) (see *Leikert et al.*, col. 3, lines 34-35) and is distributed uniformly in the combustion chamber (see *Leikert et al.*, col. 3, lines 55-60). Therefore, the examiner considers that the reducing agent in *Leikert et al.* is "distributed within the flame core" as recited in applicant's claims.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

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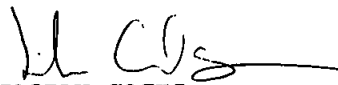
may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://portal.uspto.gov/external/portal/pair>. Any questions on access to the Private PAIR system should be directed to the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Josiah Cocks whose telephone number is (703) 305-0450. The examiner can normally be reached on weekdays from 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ira Lazarus, can be reached at (703) 308-1935. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0861.

jcc
October 25, 2004


JOSIAH COCKS
PRIMARY EXAMINER
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